



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/837,387	04/19/2001	Juan G. Gonzalez	2925-0495P	7292
30594	7590	02/05/2007	EXAMINER	
HARNESS, DICKEY & PIERCE, P.L.C. P.O. BOX 8910 RESTON, VA 20195			KIM, KEVIN	
			ART UNIT	PAPER NUMBER
			2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/05/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/837,387	GONZALEZ ET AL.	
	Examiner Kevin Y. Kim	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 31 October 2006.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-3,5-7 and 9-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-3,5 and 9-12 is/are rejected.
- 7) Claim(s) 6,7 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) Notice of Informal Patent Application
- 6) Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed October 31, 2006 have been fully considered but they are not persuasive.

Applicant argues that the average channel estimate of each transmission symbol of a single slot, taught by the Kim patent, is not "an overall channel estimate" recited in the claim. Even though named differently they are identical since the former is a weighted average of the channel estimates of several slots and the latter is, similarly, a weighted average of a plurality of channel estimates. Moreover, the average channel estimates of the current slot should be considered as an overall channel estimate.

Next, applicant contends that the Kim patent teach generating a single weighting constant as opposed to "an associated weighting constant, at least two of the weighting constants being different." However, the weighted average channel estimate by definition implies that different weights are given to different channel estimates. Applicant discusses the equation (10) whereby the average channel estimate is derived as the basis for the argument that "the average channel estimate of each symbol is based on a single weighting constant. However, this equation stresses that a proper value for β should be selected, where β is a coefficient limiting the detection interval, that is the accumulated number of the channel estimates. There is no indication that the weights given to a plurality of channel estimates are a single constant.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-3,5,9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Piirainen (US 6,748,031, previously cited) in view of Kim et al (US 6,868,112 previously cited).

Claims 1 and 2.

Piirainen discloses a method of estimating a communication channel (see Fig.2), comprising;

“determining at least first and second confidence levels that a transmitted data symbol has respective first and second values based on a received data symbol corresponding to the transmitted data symbol,” (see col. 3, line 66 ~ col.4, line4 describing the confidence levels or probabilities of a received symbol y having one of a plurality of values x);

“generating a channel estimate based on the first and second confidence levels over a time window of predetermined width,” (see col.4, lines 32-49 describing the calculation of a channel estimate using the probabilities of a received symbol y having one of a plurality of values x , and col.3, lines 51-54) and

generating an overall channel estimate by obtaining an average of a plurality of channel estimates. See col. 4, lines 60-63.

Piirainen fails to teach the average is a weighted average. Kim et al teaches obtaining a weighted average of channel estimates, each over a slot (i.e., “time window”). The weighted average is more accurate particularly when the channel condition is time-varying.

Thus, it would have been obvious to use the weighted average of the channel estimates in

Piirainen's channel estimation for the purpose of more accurate channel estimate, as taught by Kim et al.

Claim 3.

The calculation of a channel estimate is based on the confidence levels of the received symbols since it used the mean of the probabilities/confidence levels as well as the received data symbol y_k . See the equation at col.4, lines 35-40.

Claim 5.

Referring to Fig.2, Piirainen discloses a method of making a channel estimate, comprising:

“generating a confidence factor according to a confidence function and a received data symbol, the confidence factor representing a confidence level that a transmitted data symbol corresponding to the received data symbol has a particular symbol value,” (see col. 3, line 66 ~ col.4, line 4 describing probabilities of a received symbol y having one of a plurality of values x , i.e., the confidence factor according to “a confidence function,” i.e., a Viterbi detecting function, see col.3, line 66 ~ col.4, line 4);

“generating a channel estimate based on the confidence factor and the received data symbol over a time window of predetermined width.” (see col.4, lines 32-49 describing the calculation of a channel estimate using the probabilities of a received symbol y having one of a plurality of values x and col.3, lines 51-54.) and

“generating an overall channel estimate by obtaining a weighted average of a plurality of channel estimates.” (see col. 4, lines 60-63)

Piirainen fails to teach the average is a weighted average. Kim et al teaches obtaining a weighted average of channel estimates, each over a slot (i.e., "time window"). The weighted average is more accurate particularly when the channel condition is time-varying.

Thus, it would have been obvious to use the weighted average of the channel estimates in Piirainen's channel estimation for the purpose of more accurate channel estimate, as taught by Kim et al.

Claim 9.

Referring to Fig.2, Piirainen discloses a method of making a channel estimate, comprising:

"determining a strength indicator based on a received data symbol corresponding to a transmitted data symbol, a value of the strength indicator indicating a likelihood that the transmitted data symbol is a particular value," (see col. 3, line 66 ~ col.4, line 4 describing probabilities of a received symbol y having one of a plurality of values x , i.e., "a strength indicator" of the received symbol);

"generating a channel estimate based on the confidence factor and the received data symbol over a time window of predetermined width l ." (see col.4, lines 32-49 describing the calculation of a channel estimate using the probabilities of a received symbol y having one of a plurality of values x and col.3, lines 51-54) and

"generating an overall channel estimate by obtaining a weighted average of a plurality of channel estimates." (see col. 4, lines 60-63)

Art Unit: 2611

Piirainen fails to teach the average is a weighted average. Kim et al teaches obtaining a weighted average of channel estimates, each over a slot (i.e., "time window"). The weighted average is more accurate particularly when the channel condition is time-varying.

Thus, it would have been obvious to use the weighted average of the channel estimates in Piirainen's channel estimation for the purpose of more accurate channel estimate, as taught by Kim et al.

Claims 10 and 11.

Piirainen teaches a binary modulation, one of which is the bi-phase shift keying, where a transmitted symbol obtains the values of 1 or -1. See col. 4, lines 22-24. Thus, the strength indicator, i.e., a numeral representation of probability, approaches a value of 1 the greater the likelihood that the transmitted data symbol was 1 and approaches a value of -1 the greater the likelihood that the transmitted data symbol was -1.

Claim 12.

The claim calls for performing the probability determinations and the strength indicator determination according to a predetermined function. Piirainen teaches describing computing the probabilities according to a Viterbi detecting function. See col.3, line 66 ~ col.4, line 4.

Allowable Subject Matter

4. Claims 6 and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

3. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Y. Kim whose telephone number is 571-272-3039. The examiner can normally be reached on 8AM --5PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

Art Unit: 2611

system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

January 20, 2007

AU 2611

KEVIN KIM

PRIMARY PATENT EXAMINER

